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Quantum Communications Team Bios

Jane E. (Beth) Nordholt (P-21) is a LANL Fellow and Principal Investigator of the Quantum Communications (QC) team. She and Richard Hughes are the inventors of the methodologies which make long-distance free-space QC possible. She is also the inventor of satellite-based QKD which is being pursued in many countries. Beth holds three patents, two on QKD, with two QC applications in progress. She has also worked with National Security Agency personnel on studies of the security of QKD and has written two major classified studies on the subject. Beth also started the now world-wide effort to increase fiber QC distances and security by using specialized detectors in collaboration with NIST Boulder, which led to staff positions for the three post-doctoral fellows involved. These efforts led to world-wide efforts to develop better detectors for telecom wavelengths and increased research in the two types of detectors used: Transition Edge Sensors and SSPDs. She has worked with Telcordia personnel on their Washington, D.C.-area testbed, ATDnet, and was co-lead on the development of the QC-team's development of engineered fiber QKD systems: F3a, F3b, and F3lab, which have been the subject of many world record papers as well as many joint papers with Telcordia on QKD in networks. Beth has four LANL Distinguished Performance Awards, three of which are related to QKD. Beth was principal investigator on the Genesis Concentrator, the Deep Space 1 (DS1) Plasma Experiment for Planetary Exploration (PEPE), and led the Cassini Ion Mass Spectrometer invention and development. She also has received NASA Group Achievement Awards for her work on the Polar/TIDE, Cassini/CAPS, and DS1/PEPE spacecraft, as well as the DS1 flyby of comet Borrelly. She has been a member or chair of several NASA proposal review panels and was co-Lead on the NASA New Millennium Project's Instrumentation team. Beth has extensive experience in leading science and engineering research projects.

Richard J. Hughes (P-21) is a Laboratory Fellow in the Physics Division at Los Alamos National Laboratory. He is co-principal investigator of projects in both free-space and optical fiber based QC and holds two US patents in these areas, with two applications in progress. Richard obtained his Ph.D. in Theoretical Elementary Particle Physics from the University of Liverpool, England in 1978 and has held research positions at: Oxford University and The Queen's College, Oxford; the California Institute of Technology; and CERN, Geneva, Switzerland. He has held distinguished visiting scientist positions at Oxford University (Dr. Lee Fellow, Christ Church, 1994) and at the University of Oslo, Norway (1993). In 1996, 1998 and 2006 he was awarded Los Alamos Distinguished Performance Awards for his quantum cryptography research, and in 1997 he was awarded the Los Alamos Fellows' Prize for his work on quantum information science. He became a Fellow of the American Physical Society in 1999. In 2001 he was co-winner of an R&D100 Award for "Free-space quantum cryptography". Starting in 2001, Richard led the US Government's Quantum Information Science and Technology Roadmap (http://qist.lanl.gov). In 2003 Richard and the Los Alamos Quantum Key Distribution Team won the US Government's J. David Murley Milestone Award for the delivery of the world's first QKD Transmitter Brassboard on cost, on schedule, and surpassing

government performance goals. In 2004 Richard and the LANL QKD Team were co-winners of the European Union's Descartes Prize. Richard serves on the US Government's Quantum Information Science Panel. He co-authored the Quantum Information Science Net Assessment, released in January 2008. He has authored over 140 scientific papers on quantum field theory, the foundations of quantum mechanics, quantum cryptography and quantum computation.

Raymond Newell (P-21) received M.S. and Ph.D. degrees in physics from the University of Wisconsin at Madison, and a B.A. cum laude from Pomona College. Raymond's graduate and post-doctoral work in ultracold atomic physics provided a strong background in quantum physics and the state-of-the-art laser, optical, and photonic technologies employed in its research. Raymond worked as chief test and measurement engineer at Siros Technologies, a holographic data storage company. He joined the LANL QC team in 2005 and developed the first polarization-tracking system employed in free-space QC. Raymond's expertise with precision optical and photonic assemblies has led to many crucial developments in the field, including a fully automated QC receiver, a novel ultra-compact polarization analyzer, and electro-optic polarization state generators. The path-breaking nature of this work has prevented its publication in open literature; it has been presented to and very well received by government sponsors at design reviews.

Charles G. Peterson (P-21) received a diploma in Laser-Electro-Optics Technology from Albuquerque Technical Vocational Institute in 1984. He worked five years at Boeing Aerospace, building and operating large experimental pulsed chemical laser systems, and integrating a variety of diagnostic instruments. Since becoming employed with Los Alamos National Laboratory in 1989, Glen has participated in efforts at the Nevada Test Site, the NOVA laser (LLNL), and the OMEGA laser (UR-LLE), to name a few. Having joined the QC team in 1995, he has been a key player in the design and deployment of numerous fiber-based and free-space QKD systems and experiments. His expertise is acquisition, sub-nanosecond timing, quantum measurements, and LabView control of complex experiments. In 2004, Glen's contributions and achievements were acknowledged through reclassification from technician to scientist. He holds three U.S. Patents, is recipient of the J. David Murley Milestone award, the Descartes Prize, an R&D 100, three team Distinguished Performance awards, and has co-authored dozens of articles in quantum information.

Nicholas A. Dallmann (ISR-4), Electrical Engineer / Systems Engineer. 8 years as an Engineer in a satellite instrumentation group at LANL with both space and terrestrial instrument development experience. Has participated in the development of the electro-optics, FPGA based protocols, and systems design for the LANL fiber and freespace Quantum Key Distribution (QKD) systems. BS Purdue University 2002 in Computer Engineering. Undergraduate focus in VLSI, hardware description languages (VHDL), and computer programming. Graduate work in Electrical Engineering focused on semiconductor physics and microwave circuit design. Digital design experience includes computer programming, VHDL for FPGAs, logic simulation, high speed PCB design, simulation, and test. Analog design experience includes simulation, high frequency pulse circuitry, power supplies, digitization, etc. Research interests include radiation effects on microelectronics and applied electromagnetics.

Kevin McCabe (ISR-4) has a B.S.E.E. from Washington University and an M.S.E.E. from Southern Methodist University with a focus on electro optics. Since 1998 he has acted as Lead Engineer or Principal Engineer for 30 space instruments including ground breaking work on Time-of-Flight instruments on the Cassini mission to Saturn and the New Millennium's Deep

Space 1 mission to an asteroid and comet. Since 2000 he has served as the Principal Engineer for all LANL QC programs providing technical and project management leadership. Numerous successes in this area include the design and construction of the first software-reconfigurable optical fiber QC system, which has been used for the first demonstration that QC can co-exist with conventional optical data within real-world transparent optical networks, showing that QC can be made practical in the real world. He has received 2 Distinguished Performance Awards and numerous NASA Group Achievement Awards. He has co-authored 28 publications.

James Thrasher (ISR-4) has a M.S. in Electrical Engineering from Stanford University with a focus on communication and information theory. Prior to joining LANL, he was employed as a Network Deployment Engineer for WorldCom Communications. He has been actively involved with quantum communications since 2001 and, most recently, was the Lead Subsystem Engineer for a multi-year QKD effort. With a strong interest in making quantum cryptography a reality, he has designed and developed robust QKD hardware and software systems. Professionally, he has served for many years on the Laboratory Directed Research and Development (LDRD) selection committee and is up for election for the LANL Foundation's Scholarship Committee. As a member of the LANL effort, he currently holds one Distinguished Performance award and the European Union's Descartes Prize. Individually, he holds several academic honors of distinction and has worked as a mathematics professor at his alma mater, The Oklahoma School of Science and Mathematics.